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NCBC DAVISVILLE
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UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION I
J.F. KENNEDY FEDERAL BUILDING, BOSTON, MASSACHUSETTS 02203-2211

May 12, 1995

Mr. Robert Krivinskas
U.S. Department of the Navy
Northern Division - NAVFAC
10 Industrial Highway
Code 1823 - Mail Stop 82
Lester, PA 19113-2090

Re: Redlined Version of the Draft Ecological Risk Assessment Report (ERA) at Sites 05 & 08, former Naval Construction Battalion Center, Davisville, RI

Dear Mr. Krivinskas:

Pursuant to § 7.6 of the NCBC Federal Facility Agreement (FFA), please find attached the Environmental Protection Agency's (EPA) comments on the above referenced document. These issues should not be a cause for a delay in the overall schedule for this OU, however, an acceptable draft final report must be available to the public at the start of the comment period on the Proposed Plan for this OU. The Navy's written and verbal responses were, for the most part, adequate. The document does provide enough information to the risk manager to make a decision about the Sites 5 & 8 and therefore does not need to be revised beyond this red-lined version. However, the attached issues must be addressed more substantially in the facility-wide ERA since the ecological risks may not be as clear-cut as they are at Sites 5 & 8. The attached general and specific comments, accordingly, are provided to facilitate the development of the site-wide ERA, however, if FFA time constraints prohibit the Navy from addressing these issues for the May 19, 1995 deadline, the EPA will reiterate these comments and the Navy must then address them in the draft-final site-wide ERA.

Please call me if you have any questions about these comments at (617) 573-5736.

Sincerely,

Christine A.P. Williams
Remedial Project Manager
Federal Facilities Superfund Section

Attachment

cc: Judy Graham, RIDEM
Tim Prior, US F&WL
Bob DiBiccaro, EPA
Scot Gnewuch, ADL

PRINTED ON RECYCLED PAPER

EPA Comments on the Red-Lined Version of the Ecological Risk Assessment for Sites 05 & 08 at the former Naval Construction Battalion Center, Davisville, RI

General Comments

For the most part, the Navy's April 3rd responses were reasonable and had proposed acceptable technical approaches to resolving key issues raised in the initial review of the Draft ERA Report. In some instances, however, all of the commitments made in the Navy's formal responses were not completely fulfilled in the text and/or tables of the red-lined pages submitted. The document does, however, provide enough information to the risk manager to make a decision about the Sites 5 & 8 and therefore does not need to be revised beyond this red-lined version. However, these issues must be addressed more substantially in the site-wide ERA. These further comments are provided to facilitate the development of the site-wide ERA, however, if FFA time constraints prohibit the Navy from addressing these issues for the May 19, 1995 deadline, the EPA will reiterate these comments and the Navy must then address them in the draft-final site-wide ERA.

The following general and specific comments, accordingly, focus on the extent to which the Navy's red-lined pages fulfill the commitments made in their April 3rd responses and/or resolve the issues raised in the initial review of the draft report.

Resolved Issues. The following are those comments/responses for which the commitments made in the Navy's responses were fulfilled and/or the revised analyses and text/tables appear to have adequately resolved the issues raised in the initial review:

- Comment Nos. 1 and 6, pertaining to discussions of contaminant fate and transport

- Comment No. 4, second, fourth and sixth bullets, pertaining to the exposure assessment and its parameters

Unresolved Issues. Key technical and/or data presentation issues that still need to be resolved in the revised report include the:

- Documentation of the COC screening criteria and presentation of site background data, and

- The derivation and rationale for choice/use of Toxicity Reference Values (TRVs)

The justification of the TRVs is the most critical of these two issues. As discussed in more detail in the following section on specific comments, the red-lined pages fail to convincingly support the TRV selection and applications in the revised ERA report. While the risks to indicator species may prove to be

insignificant, more scientifically rigorous and defensible arguments must be provided in the ERA to justify the inter-species and mammal-bird extrapolations and choices of TRVs used to calculate risks.

Specific Comments

The following are comments/responses pertaining to issues that were not fully resolved in the red-lined pages:

- Comment No. 2 (COC Screening) - Although the COC screening process was explained adequately, the Navy's pledge in the 4/3/95 response, to "extend the discussion based on...scientific literature," was not fulfilled. A key concern is that neither the site-specific appropriateness nor the ecotoxicological derivation (which species/models?) of the screening criteria used (e.g., Dutch soil criterion for PCBs) were discussed, as requested in the original comment and agreed to in the April 3rd response. Although the basis for the presumed acceptability of these criteria to EPA Region 1 was clarified, the site-specific and original, ecotoxicological derivation of these screening criteria still warrants explanation in the ERA report. The Navy must use the lower of the 3 benchmark values presented in the Dutch and Quebec criteria (Beyer 1990), instead of the values representing moderate soils contamination, for a more conservative screening approach.

- Comment No. 3 (Exposure Modeling) - Although the revised pages and new risk summary tables significantly improve and clarify the presentation of risk calculations, using both predictive (Monte Carlo modelled) and measured COC concentrations, corresponding revisions are still needed in the text of the executive (Page ES-1) and risk (Page 4-5) summaries of the report. Specifically, comparisons are needed of the revised calculations to distinguish among the modelled versus measured, average and maximum, COC-specific hazard quotients (HQs), and COC class-level hazard indices (HIs).

- While the risk characterization section is improved, one modification that would increase the clarity of the presentation would be to include a table(s) that presents the equations, input parameters and results for the average and maximum risk estimates for each species and site. An example of how this might be accomplished is presented as page 1 and 2 of Attachment I. The inclusion of these tables would be conducive to a more complete and thorough document. While not presented on the attached tables, if the concentration in soil and/or water is modified to reflect bioavailability, include the factor for the modification as well.

- It is the EPA's understanding that shrews have a very high metabolic rate and therefore need to consume their body weight in food in each day. This assumption has been used in ERAs that have been accepted by the EPA, including the ERA for Picillo Farm (Arthur D. Little, June 11, 1993). The model as stated now, assumes approximately 50% of their body weight.(This is a change from the draft ERA where the table 3-1 indicated shrews consume only 85% of their body weight. See comment 4 bullet # 3) Please explain/justify. Additionally, Table 3-1, which presents shrew food-ingestion data for a ferruginous hawk, has a confusing reference. Should this reference be Burt and Grossenheider?

- Please explain the last sentence of the fifth paragraph on page 4-1 "The exposure of this organism is therefore the average of the entire impact zone." If the home range of the receptor is less than the site affected area, the site foraging factor (SFF) should be one, otherwise the SFF is the ratio of site affected area to the home range of the receptor. To emphasize the need to incorporate comment 4 into the final document, note that a reviewer should be able to determine the SFF from the risk computations.

- On Table 4-1 the lead risk to the shrew from Site 05 and 08 are 4.28 and 1.86. On Table 4-2, the lead risk to the shrew from Site 05 and 08 are 3.79 and 4.08. Why do risk estimates decrease for Site 05 and increase for Site-08? Is this a result of the concentration distributions used in the Monte Carlo analysis? Again, the answer might be readily apparent if the calculations were presented in tabular format.

- Comment No. 4 (1st, 5th and 7th Bullets) - Although adequate responses were made to these comments on April 3rd, the newly submitted text does not completely fulfill all of the pledges of the response, such as the proposals to:

  - "discuss the range in adsorption factors for soils similar to those at the site," and

  - "validate the adsorption constants...by reference to empirical bioaccumulation factors."

  For example, a tangential discussion of sediment particle versus pore water contaminant bioavailability is provided, but no pertinent information on COC availability/adsorption in upland soils was provided, even in generic terms, nor are any data presented regarding the physicochemical features of the upland soils at the sites.

  Also, the red-lined pages appear not to provide the clear discussions or tabulations of the various bioavailability

factors used in the exposure models, as had been proposed in the response to the seventh bullet. Finally, neither the text nor Table 3-3 clearly indicate whether the new, "C-available" column in Table 3-3 presents bioavailability factors or calculations of the actual, bioavailable COC concentrations in the soil.

- Comment No. 5 (TRVs) - The discussions and tabulations of the derivation and use of TRVs in the red-lined pages still appear inadequate. They do not clearly indicate which extrapolation factors (EFs) were applied among the various test versus indicator animal species. It also appears that the pledge in the April 3rd response to the second bullet, "to eliminate...extrapolations among vertebrate classes," was not fulfilled, since for example, a mouse to robin TRV EF for benzo(a)anthracene is one of several inter-class extrapolations still indicated in Table 3-10 as being "required." Further, the same EF of five (5) still seems to be used across Classes and other large phylogenetic distances between species, such as Orders, Families and Genera, without adequate scientific rationale. The original comment, objecting to the use of the same EF for all inter-species extrapolations, irrespective of their varying taxonomic/phylogenetic differences, appears not to have been completely understood or addressed. Inconsistent decisions made in Table 3-10, as to the need for using EFs between faunal species, suggest to the reader that such decisions were made subjectively. In some cases, for example, EFs were deemed as necessary between species of different Orders (e.g., Guinea fowl to hawk for manganese), while other inter-order EFs were judged as not necessary (e.g., mouse to shrew and rabbit for fluoranthene et al., COCs).

  Also, no April 3rd response or red-lined text was provided to address the second part of the third bullet of this Comment No. 5, explaining why the species-specific DDT TRV was cited but then not used for the shrew. Finally, although the feeding guild conceptual approach to TRV selection as discussed in the new text of red-lined Page 3-12 can be useful when used across appropriate phylogenetic distances (i.e., below the ordinal or familial taxonomic levels), it is not appropriate to group Cottontail Rabbits and Shrews in the same guild, simply because they both eat at least some vegetation, since these species belong to different Genera, Families and Orders, and the shrew's diet consists mostly of invertebrate fauna, while the rabbit is a strict herbivore. (Based on the logic used to define this guild, one could also apply a TRV for an herbivorous fish, to assess exposure risks for an herbivorous mammal or human vegetarian.).

  In summary, although a TRV EF of 5 may or may not be scientifically defensible for one or more COC-specific TRV

extrapolations between various pairings of species, the data and biological rationale as currently discussed in the ERA does not convincingly support the extrapolation decisions that were made in Table 3-10. Although true that no formal EPA guidance is available as to appropriate EFs for various phylogenetic distances, we know of at least one as of yet unpublished document that presents such information for use in TRV development. See Attachment I (pages 3 and 4) for the information of an alternative approach that has been accepted previously by the EPA. We do not have the full citation, as this was presented at a conference and is not yet published.

- Comment No. 7 (Background Soil Data) - Although the source of the background soil data used in the COC screening was discussed in more detail in the red-lined text, the commitment in the April 3rd response, to "present and discuss in detail the site background data," does not appear to have been satisfied by the recent submittals. A COC screening table, in which both the background data and screening criteria are presented, would resolve this issue.

- Comment No. 8 (Miscellaneous) - The pledge made in the April 3rd response, to "implement all of the suggestions" made in this comment, was mostly fulfilled. The sole exception is:

  - the continued lack of revised figures that illustrate the site boundaries as overlays on the photographs (the revised captions are not sufficiently helpful regarding boundaries).

Attachment D Title 6

EQUATIONS

$$Dose\ (mg/kg/day) = \frac{IR \times ((PFa \times CF) + (PFw(CS((BAFs \times PDs) + (BAFf \times PDf) + (BAFb \times PDb))))) + (PFu \times CCF))}{BW}$$

$$HI = Dose/NOAEL$$

MINK RECEPTOR ASSUMPTIONS

Scenarios	Ingestion Rate (mg/kg)	Body Weight (kg)	Percent of Foraging in Aquatic Zone (%)	Percent of Foraging in Upland Zone (%)	Percent of Foraging in Wetland Zone (%)	Percent of Small Mammals in Wetland Diet (%)	Percent of Clean Prey in Wetland Diet (%)	Percent of Frogs in Wetland Diet (%)
			Exposure Parameters					
Parameter Symbol	IR	BW	PFa	PFu	PFw	PDs	PDc	PDf
100% Site Wetland	0.15	1	0%	0%	100%	65%	30%	5%
100% Country Pond	0.15	1	100%	0%	0%	-	-	-
60% Site-Affected Wetland/20% Country Pond	0.15	1	20%	20%	60%	65%	30%	5%
Variable Foraging (Monte Carlo Analysis)	0.15	1	TRIANG(10,20,60)	TRIANG(0,20,30)	1-(PFa+PFu)	TRIANG(40,65,80)	1-(PDw+PDf)	TRIANG(0,5,20)
100% Reference Wetland	0.15	1	0%	0%	100%	65%	30%	5%
100% Great Pond	0.15	1	100%	0%	0%	-	-	-
60% Reference Wetland/20% Great Pond	0.15	1	20%	20%	60%	65%	30%	5%
Variable Foraging (Monte Carlo Analysis)	0.15	1	TRIANG(10,20,60)	TRIANG(0,20,30)	1-(PFa+PFu)	TRIANG(40,65,80)	1-(PDw+PDf)	TRIANG(0,5,20)

NOTES:
CF = Concentration of contaminant in fish tissue
CF = Concentration of contaminant in food
CCF= Concentration in clean food. Assumed to be zero.
TRIANG = a triangular distribution defined by a minimum value, a most likely value, and a maximum value Triangular distributions are used in Monte Carlo analysis when actual data to define the distribution is absent.
BCFs,f, or b is the bioaccumulation factor for small mammals, frogs, or birds respectively

Arthur D Little

Compound	NOAEL	Fish Tissue Concentration		Soil Concentration		Dose mg/kg/day	
	mg/kg/day	Average (mg/kg)	Maximum (mg/kg)	Average (mg/kg)	Maximum (mg/kg)	Average (mg/kg/day)	Maximum (mg/kg/day)
Organics							
Total PCBs	0.01	0.34	0.95	81	231	1.1	3.1
Total Pesticides	0.003	0.23	0.48	2.2	7.9	0.23	0.81
Inorganics							
Chromium	147	-	-	236	656	2.4	7
Lead	1	0.04	0.16	711	1,645	4.317	10

Hazard Quotient		
Compound	Average	Maximum
Organics		
Total PCBs	108	310
Total Pesticides	75	269
Subtotal Organics	***184***	***579***
Inorganics		
Chromium	0.02	0.05
Lead	4	10
Subtotal Inorganics	***4***	***10***
Total Hazard Index	***188***	***589***

NOTES:
NOAEL is the No Obsevable Adverse Effects Level
Fish tissue concentrations are found on Table 4-4 and soil concentrations are found on Table 4-3
Formula and exposure parameters for computing dose are found on Table 4-7

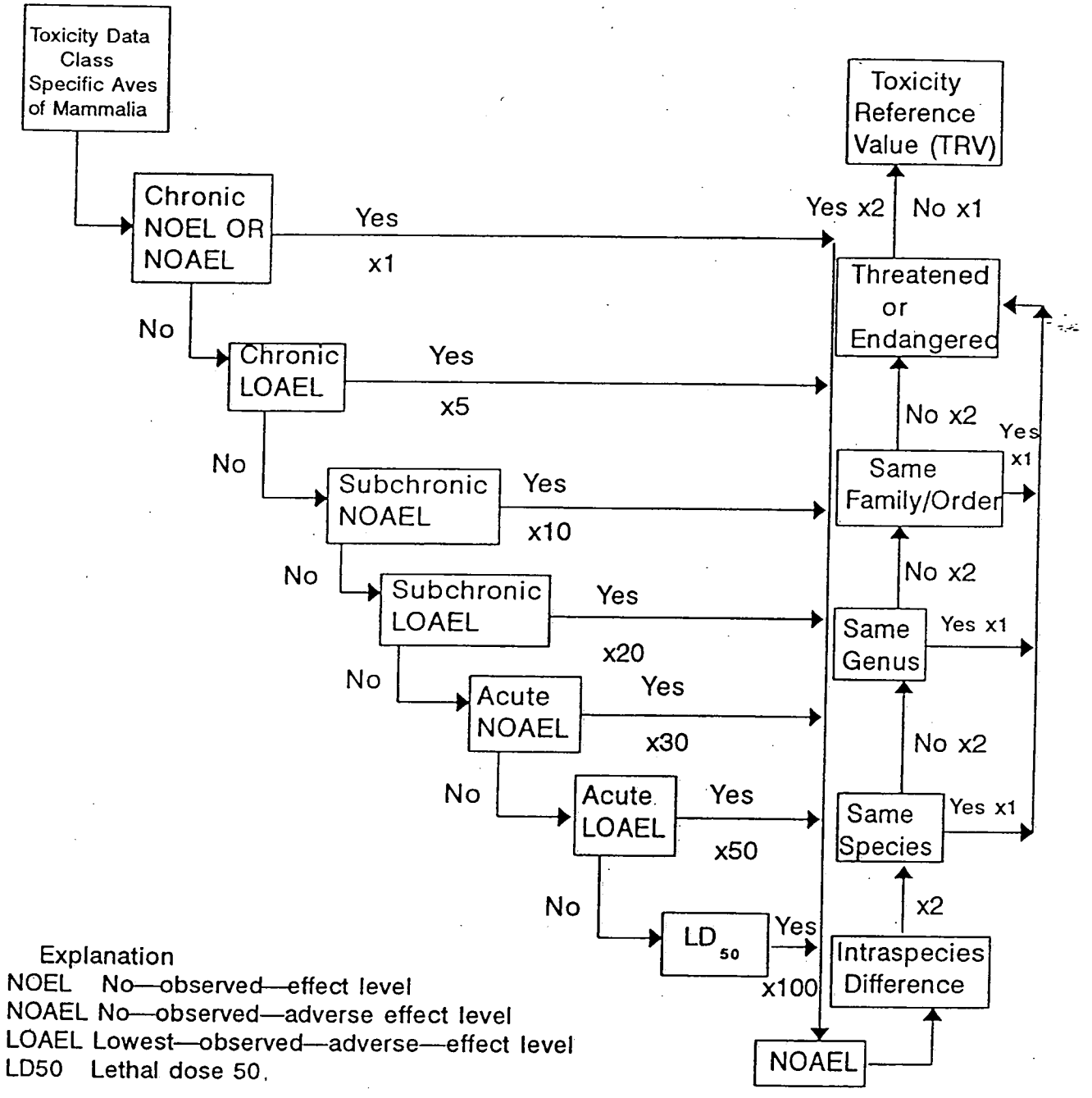
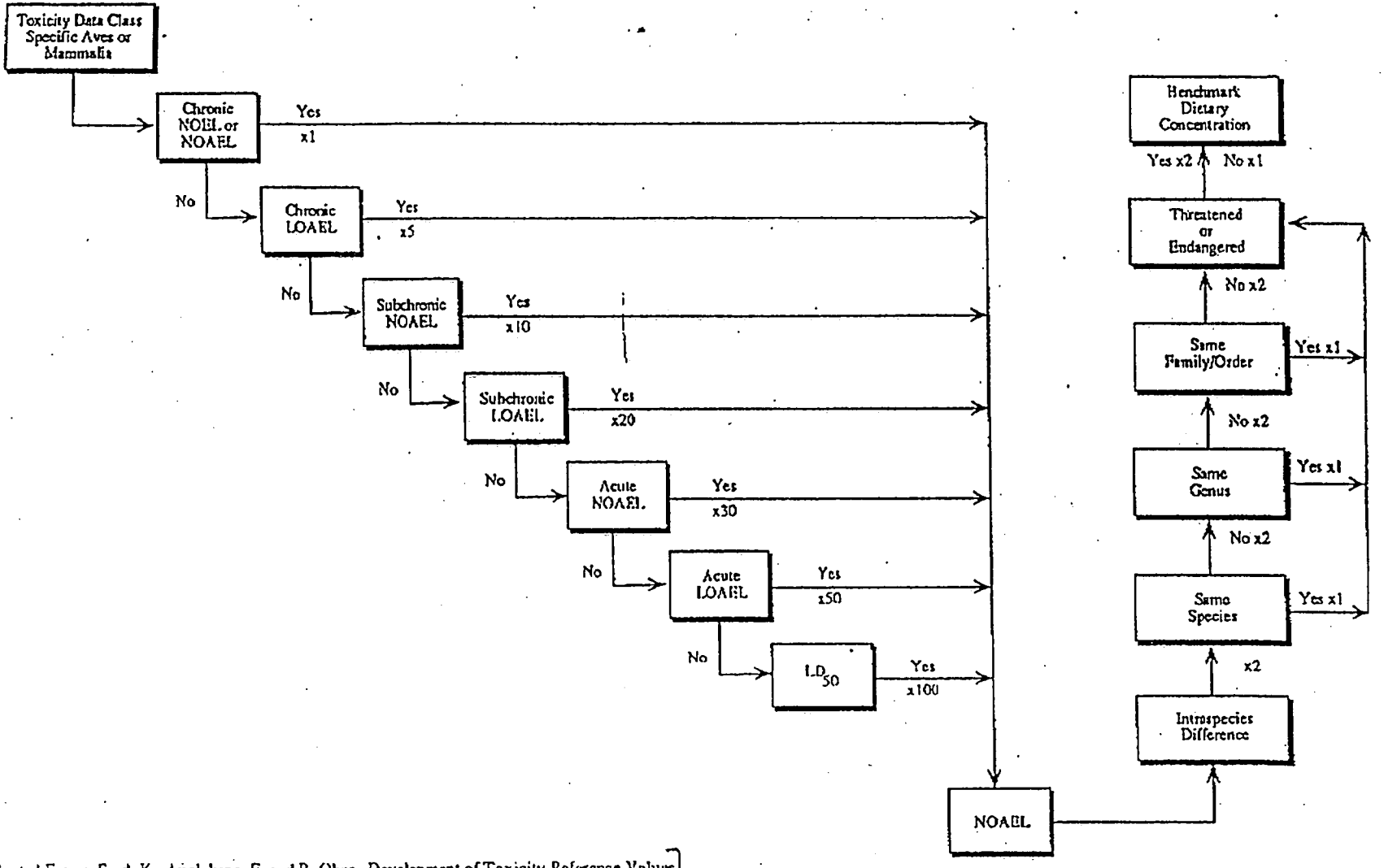


Figure 12. Methodology to derive toxicity reference values (TRV's) from class—specific toxicity data.

P. 11/26
Arthur D. Little
APR-19-94



Adapted From: Ford, K. Applehans, F. and R. Ober. Development of Toxicity Reference Values for Terrestrial Wildlife presented at 1992 Superfund Conference.

METHODOLOGY TO DERIVE DIETARY BENCHMARK CONCENTRATIONS FROM CLASS-SPECIFIC TOXICITY DATA

CDM FEDERAL PROGRAMS CORPORATION
a subsidiary of Camp Dresser & McKee Inc.

Figure 7-2